

INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 2005	Park: Shenandoah NP						
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Name: aaron mills	Phone: (434) 924 0564	Email: amills@virginia.edu					
Permit#: SHEN-2003-SCI-0010							
Park-assigned Study Id. #: SHEN-00286							
Project Title: Hydrology of Big Meadows, Shenandoah National Park, Virginia: Assessment of a Sensitive Wetland System in the Blue Ridge Mountains							
Permit Start Date: Jun 03, 2003	Permit Expiration Date Oct 01, 2005						
Study Start Date: Jun 03, 2003	Study End Date Oct 01, 2005						
Study Status: Continuing							
Activity Type: Research							
Subject/Discipline: Water / Hydrology							
Objectives: Description of Recommended Project or Activity The hydrology of Big Meadows is driven by (1) seasonal changes in climate; (2) rainfall and snowfall events; and (3) pumping for water supply. Ground-water levels respond to all of these driving variables. The level of water in the fens, and therefore their lateral extent in terms of saturated or nearly saturated areas, likewise vary. The space-time variations in water levels is precisely the knowledge needed to assist in management of Big Meadows. The best tools for studying management options are monthly water balance models, both standard climatological water balances and balances informed by using a ground-water model. The primary data necessary to develop and calibrate such models are meteorological data and data on ground-water levels. A full meteorological station operates at Big Meadows and these data will be available for this study. The work in this project will therefore concentrate on collecting additional data on ground water, on analyzing these data, and on synthesizing the data through the use of models.							
Findings and Status: Climatological data for a sixty-year record at Big Meadows were assembled and analyzed. Analyses included a Thornthwaite water balance and calculation of a Palmer Drought Severity Index (PDSI). Analysis of the PDSI at Big Meadows supports the recent hypothesis that the frequency distribution of soil-water is bimodal as a result of nonlinear interactions between the soil, plants, and the atmosphere. This work is being prepared for submission to a journal. A report on the water-balance computation and results is also being prepared. Installation of shallow monitoring wells was completed. Water levels in these wells and in the existing deep wells will be studied over the coming year. The proposed pumping test was postponed until these data can be analyzed rigorously.							

Mssrs. Spitzer and Hornberger met in the field in June to lay out a plan for measuring soil moisture. An array of soil-moisture sampling locations was determined and soil moisture was measured across the Meadow periodically from June 2005 throughout the reporting period. Spatial variability in soil moisture is quite high and related to topography and aspect. Temporal variability is, as expected, related primarily to rainfall and evapotranspiration.

For this study, were one or more specimens collected and removed from the park but not destroyed during analyses?

No

Funding provided this reporting year by NPS:

41800

Funding provided this reporting year by other sources:

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Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college

Full name of college or university:

University of Virginia

Annual funding provided by NPS to university or college this reporting year:

41800